ENGINEERED LUMBER STUDS FOR INTERIOR WALL CONSTRUCTION

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DESCRIPTION

BACKGROUND OF THE INVENTION

[0001] Field of the Invention. The present invention generally relates to stressed skin wall panels, and more particularly relates to engineered lumber studs and interior wall panels made from stressed skin wall panel (rigid insulating core) construction.

[0002] Background Information. Traditionally, residential construction has been made through the use of a plurality of frames made of dimensional lumber. These frames typically having an outer skin made of oriented strand board (OSB) insulated with fiberglass or other insulation and having a gypsum board (sheetrock) interior finish thereby creating the exterior wall of the structure. Interior walls of such buildings typically comprise dimensional framing covered with sheetrock on both sides, with or without insulation there-between.

[0003] More recently, construction has seen the introduction and use of what is known as stressed skin paneling, also known as structural insulating panels (SIP) or rigid insulating (foam)

core panels. Such typical panels being comprised of a sandwich of a pair of OSB skins and foam (typically expanded polystyrene (EPS)). Typically, the EPS adheres to both of the OSB skins, thereby creating a structural panel. Advantages to using such structural panels include reduction in labor costs during installation, as well as increased thermal efficiency and the ability to form conduits there through for ease of wiring and retrofit wiring.

[0004] However, in such modular building panel creation, interior walls are typically still created the old-fashioned way, namely creating a 2X4 structural dimensional lumber frame, which is then faced with sheetrock.

[0005] What is needed is an alternative engineered lumber stud (to substitute for dimensional lumber), as well as an improved interior wall made from said engineered lumber studs. The present invention solves these needs.

[0006] Additional objects, advantages and novel features of the invention will be set forth in part in the description which follows and in part will become apparent to those skilled in the art upon examination of the following or may be learned by practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

[0007] The present invention is a method of building an engineered lumber stud, as well as a method of using such studs to form a modular wall panel for use in the construction of buildings. The preferred embodiment of the invented engineered lumber stud creation method generally comprising two steps: creating or providing a panel body and cutting said panel body into a plurality of studs.

[0008] The first step being creating a panel body having a first structural skin that is interconnected via an interconnecting insulating foam core to a second structural skin. Alternatively, a panel body can be provided (for instance using a preformed SIP panel body) rather than independently creating one for use in creating the invented stud. This disclosure's use of "created" is likewise thus intended to include "provided." This body panel (whether created or provided) being cut via a cut through the first and second structural skins to create a plurality of general parallelepiped engineered lumber studs. Each lumber stud having a first skin piece, an insulating foam core piece, and a second skin piece. These engineered lumber studs can be further processed as necessary (before or after cutting into studs), for instance creating conduits there through for wiring, etc. Likewise, these engineered lumber studs could be individually created by precutting the skin pieces and foam and adhering them together by precutting the skin

pieces and expanding the foam there between, etc.

[0009] The present invention also comprising a prefabricated modular wall panel comprising a plurality of the invented engineered lumber studs arranged in series. These studs, either at the place of manufacture or at the job site, are interconnected, preferably through use of at least one top plate and one bottom plate. The studs being interconnected between the top plate and the bottom plate in a predetermined spaced relationship thereby forming a prefabricated interior wall panel.

[0010] The purpose of the Abstract of the Disclosure is to enable the United States Patent and Trademark Office and the public generally (especially the scientists, engineers, and practitioners in the art who are not familiar with patent or legal terms or phraseology), to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application. The Abstract of the Disclosure is neither intended to define the invention of the application, which is measure by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

[0011] Still other objects and advantages of the present invention will become readily apparent to those skilled in this art from the following detailed description wherein I have shown

and described only the preferred embodiment of the invention, simply by way of illustration of the best mode contemplated by carrying out my invention. As will be realized, the invention is capable of modification in various obvious respects all without departing from the invention. Accordingly, the drawings and description of the preferred embodiment are to be regarded as illustrative in nature, and not as restrictive in nature.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is one example of the manufacture of one embodiment of the engineered lumber stud of the present invention.

[0013] Fig. 2 shows one embodiment of a prefabricated wall panel created using the engineered lumber studs of the present invention.

[0014] Fig. 3 shows a cross-sectional view of an engineered lumber stud embodiment of the present invention as installed.

[0015] Fig. 4 shows a cross-sectional view of another engineered lumber stud embodiment of the present invention as installed.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] While the invention is susceptible of various modifications and alternative constructions, certain illustrated embodiments thereof have been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific form disclosed, but, on the contrary, the invention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention as defined in the claims.

[0017] The present invention includes an engineered lumber unit, a method of making said engineered lumber unit, and a wall made of said engineered lumber units. Other embodiments of the present invention likewise exist and are considered within the disclosure herein.

[0018] Referring initially to Fig. 1, shown is one embodiment of the present invention. Fig. 1 shows the formation of one embodiment of an engineered lumber stud 10. This embodiment's engineered lumber stud 10 created by first creating or providing a panel body 12. This panel body 12 comprising a first structural skin 14 and a second structural skin 18, said skins preferably comprised of oriented strand board (OSB). Other skins other than OSB can be used, including but not limited to sheetrock. The preferred thickness of the OSB is 7/16", however other sizes of OSB (and other materials such a sheetrock, cement board, etc.), including but not

limited to 3/8", 5/8", and ¾" may be used. The OSB serves (among other things) like a lumber stud, to serve as a location to attach pictures, etc. The OSB could likewise be replaced by cement, board, plywood, metal, mineral, plastic, dimensional lumber, etc.

[0019] A foam core 16, preferably of expanded polystyrene (EPS), is injected or otherwise adhered there between thereby forming the aforementioned panel body 12. While a foam core is preferred, other types of material can likewise be utilized. Other types of panel bodies exist in the prior art, namely current SIP wall panels, these SIP wall panel bodies likewise could be cut into the invented engineered studs. In the preferred construction, the structural skins are placed within a jig and the EPS is injected into the cavity defined there-between. The EPS adhering to both of the structural skins, thereby forming a integrated wall panel. The EPS serving, among other things, as a spacer, spacing the structural skins apart.

[0020] Referring still to Fig. 1, this embodiment of the invented stud 10 of the present invention is manufactured by taking such a panel body 12 (including a preformed SIP panel) and cutting it into at least one engineered lumber stud 10. Each of these lumber studs 10 having a width 20 and a depth 22. It is preferred that the depth 22 be greater than the width 20. The resulting engineered lumber stud 10 having a first structural skin 114, a foam core 116, and a second structural skin 118. The resulting engineered stud can be of any size and shape so created

by its manufacturer, however it is envisioned that studs having a width of ~1.50 inches and a depth of ~3.50 inches, forming a generally right rectangular parallelepiped shape. However, other size, shapes, and manufactures are likewise possible.

[0021] It is preferred that the engineered stud 10 be formed with a first end 46 and a second end 48. Preferably, the first end 46 has defined therein a first channel 42 and the second end 48 has defined therein a second channel 44. These channels configured for receiving in structural spacers (Fig. 4, ##38, 40) and/or framing plates (Fig. 3, ## 24, 26, 124) for instance a top plate(s) and a bottom plate(s). In the embodiment shown, the foam core 116 does not extend to the first end 46 or the second end 48, thereby defining said channels between the respective ends of the first structural skin, the foam core, and the second structural skin. The stud 10 could be formed with the channels therein, the channels could be cut into the stud through removal of excess foam, etc.

[0022] Alternatively, the first structural skin and the second structural skin could be independently cut and joined in a sandwich fashion with the foam core. This foam core itself can be precut, can be formed between the structural skins, etc. Such embodiments are less preferred, in that substantial savings in time and labor could be achieved in preparing one panel body from which multiple engineered studs can be cut.

[0023] Referring now to Fig. 2, shown is one embodiment of a modular wall panel 28 built with the present invention's engineered studs 10, 110. This figure showing studs 10 of the construction shown in Fig. 3 and studs 110 of the construction shown in Fig. 4. Other stud constructions are likewise envisioned. While this figure shows use of two different kinds of stud constructions (10, 110), it is unlikely that more than one stud construction type will be used within a particular wall, the diversity shown for illustrative purposes only.

[0024] The studs 10, 110 are spaced apart at a predetermined space and attached between one or more top plates 24, 124 and at least one bottom plate 26. While the utilization of dimensional lumber for the top and bottom plates is shown, other types and styles of structures can likewise be utilized, including but not limited to the invented engineered studs, other engineered studs, steel studs, etc. The embodiment shown in Fig. 2 utilizes a pair of top plates 24, 124 and a single bottom plate 26. It is preferred that the top plate extend ¾" out of the channel.

[0025] The preferred construction of the wall shown would be done by laying the studs on the floor, installing the top and bottom plate(s) thereon (attaching them to the studs), and standing said wall up. The attachment of the studs to the plates can be through the usual construction

means, including but not limited to nails, screws, adhesives, etc. The studs can be placed a desired distance apart, for instance 24" O.C., 19.2" O.C., 16" O.C., 12" O.C., etc.

[0026] It is preferred that the studs 10, 110 (shown in Figs. 3-4) additionally comprise conduits 50 (shown in Figs. 3-4) for ease of installation of wiring, plumbing, and other subcomponents. For instance, a 1-1/2" horizontal wire chase at 46" and/or a 1-1/2" horizontal wire chase at 16". Fig. 2 shows the utilization of conduits to permit wiring 30 to be easily (without the use of a drill at the job site) run through a fabricated wall panel. Such conduits are frequently found in SIP construction.

[0027] One novel feature of the present invention is shown in Fig. 2. The electrical wiring 30 can be looped 34 through the foam of a stud 10 before connecting with an outlet box 32 or other electrical feature. By looping the wiring through the foam, the wiring becomes fixed to the stud, removing the necessity of stapling the wiring to the stud (as can be found in dimensional lumber walls). Alternatively, a wire or plastic tie 36 could be wrapped around the electrical wiring 30 and attached to the stud 10 before connection with outlet box 32.

[0028] Referring now to Fig. 3, shown is one embodiment of an engineered stud 10 of the present invention. This stud 10 having, as discussed before, a first structural skin 114, a foam

core 116, and a second structural skin 118. The stud 10 having a first end 46 extending to a second end 48. The first end 46 defining a first channel 42 and the second end 48 defining a second channel 44. The first channel 42 receiving therein the top plate(s) 24, 124. These top plates being preferably affixed to said stud, preferably through fasteners affixed through the first and second structural skins, however other manners of attachment are likewise envisioned.

[0029] The second channel 44 receiving therein the bottom plate(s) 26. This bottom plate being preferably affixed to said stud through the use of fasteners affixed through the first and second structural skins. However, other manners of attachment can likewise be utilized. A conduit 50 is likewise provided in or through the foam core 116. In such a configuration, typically, figuring that the first and second skins are each 7/16" thick, and the foam core is 3.5" thick, the resulting engineered stud has a depth 22 of 4-3/8". Obviously, other dimensions and depths are included within the present invention, this depth illustrative only.

[0030] Referring now to Fig. 4, shown is another embodiment of an engineered stud 110 of the present invention. This stud 110 having, as discussed before, a first structural skin 114, a foam core 116, and a second structural skin 118. The stud 110 having a first end 46 extending to a second end 48. The first end 46 defining a first channel 42 and the second end 48 defining a second channel 44. The first channel 42 receiving therein at least one top spacer 38, this spacer

preferably comprising a 1-1/8" x 2-5/8" piece of OSB. This spacer serving as a nailer for the 2x4 top and bottom top plates, this spacer could be comprised of other thicknesses (other than 1-1/8"), for instance, 7/16", 5/8", ¾", 7/8", and could obviously be comprised of other materials, including but not limited to plywood, dimensional lumber, metal, and plastic. This spacer affixed therein, preferably through fasteners affixed through the first and second structural skins, however other manners of attachment are likewise envisioned. The top plates 24, 124 would then be affixed to the top spacer 38.

[0031] The second channel 44 receiving therein at least one bottom spacer 40, this spacer preferably comprising a 1-1/8" x 2-5/8" piece of OSB. This spacer affixed therein, preferably through fasteners affixed through the first and second structural skins. However, other manners of attachment are likewise envisioned. The top plates 24, 124 would then be affixed to the top spacer 38. A conduit 50 is likewise provided in or through the foam core 116.

[0032] In such a configuration, typically, figuring that the first and second skins are each 7/16" thick, and the foam core is 2-5/8" thick, the resulting engineered stud has a depth 22 of 3-1/2" (the depth of a typical interior wall framed in dimensional lumber). Obviously, other dimensions and depths are included within the present invention, this depth illustrative only.

[0033] While the present invention is preferably utilized as an interior wall, finished with sheetrock or other surface, it is likewise envisioned, although not preferred, that the present invention could be used as an exterior wall, or other building component.

[0034] While it is preferred that the invented wall panel be built on the job site, it is expressly envisioned that the wall panel could be build off site, even finished (sheetrock and/or paint, etc.) off site before installation at the job site. A problem with such off site construction is in protecting the finished panels from damage and wear in transit to the job site, the absence of such a problem is one benefit to building the studs on site.

[0035] The resulting wall is square, plum, and easy to wire. The invented studs, due to their construction, do not warp or twist, are straight and light weight. These studs likewise being easier to sheetrock, are made of readily available materials, and are more environmentally friendly than using traditional dimensional lumber.

[0036] While there is shown and described the present preferred embodiment of the invention, it is to be distinctly understood that this invention is not limited thereto but may be variously embodied to practice within the scope of the following claims. From the foregoing description, it will be apparent that various changes may be made without departing from the

spirit and scope of the invention as defined by the following claims.